THERE IS CLAIMED:

1. A method of fabricating a photocrystalline plastic optical fiber comprising a core made of a core material and a cladding covering said core, said cladding being formed of at least a first substantially periodic arrangement of cavities of a cavity material disposed longitudinally in a cladding polymer matrix, and said method comprising, for fabricating said cladding:

- a step of forming a flow by simultaneously injecting:

- a liquid first composition that is a precursor of said cladding polymer and curable by ultraviolet radiation into a first series of holes in an injection plate, and

- a second composition that is unreactive to said ultraviolet radiation and is selected from a liquid composition and a gas composition into a second series of holes in said plate, said second series of holes having a substantially periodic distribution and each of said holes of said second series having as its closest neighbors holes of said first series, and

- a step of irradiating said flow with ultraviolet radiation to form said photocrystalline plastic optical fiber.

2. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein the time of contact between said compositions is less than one second.

3. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein, for fabricating said core, said simultaneous injection operation comprises injecting into a substantially central hole of said plate separate from any hole of said series of holes a liquid third composition curable by ultraviolet radiation and preferably identical to said first composition.

4. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein, for fabricating said core, said simultaneous injection operation comprises injecting into a substantially central hole of said plate separate from any hole of said series of holes a third composition that is unreactive to said ultraviolet radiation and is selected from a liquid composition and a gas composition.

5. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein, for fabricating a second periodic arrangement of cavities, said simultaneous injection operation comprises injecting into a distinct third series of holes having a substantially periodic distribution a fourth composition that is unreactive to said ultraviolet radiation, is selected from a liquid composition and a gas composition, and is preferably identical to said second composition.

6. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber comprising, after said irradiation step, at least one step of eliminating at least one of said unreactive compositions, preferably by heat treatment if said unreactive composition is a liquid.

7. The method claimed in claim 6 of fabricating a photocrystalline plastic optical fiber, wherein said elimination step leaves at least one region empty of liquid material and said method further comprises a step of filling said at least one region.

8. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein the injection pressure of each unreactive gas composition is higher than the injection pressure of said first composition.

9. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein the

viscosity of each unreactive liquid composition is higher than the viscosity of the first composition and preferably less than five times the viscosity of said first composition.

10. The method claimed in claim 1 of fabricating a photocrystalline plastic optical fiber, wherein each curable composition contains a first reactive vinyl or acrylic monomer solvent and/or a first vinyl or acrylic polymer, the composition has an intrinsic attenuation less than 5 dB/m, and each unreactive composition (B) contains a compound selected from gases such as nitrogen, air, argon, unreactive solvents such as xylene, xylenol, butyl propanol, cyclohexanone, aliphatic alcohols, lactates, fluorinated solvents, butylene glycol, propylene glycol, silicone-containing oils, and biodegradable polymers such as cellulose polymers.